Wavelength	Color
400-435	Violet
435-480	Blue
480-580	Green
580-595	Yellow
595-610	Orange
610-750	Red

A "diffraction grating" inside the spectrophotometer is used to separate white light into its component wavelengths. Any single wavelength of light can then be selected by simply turning the wavelength control dial. This selected beam of incident light then passes through a special test tube (called a cuvette) containing the test solution.

Some of the light is absorbed by the solution -- **the more concentrated the solution is, the greater the absorbance of light**. The rest of the light, called the transmitted light, passes through the cuvette, striking a light-sensitive "photoelectric cell". This photoelectric cell generates an electrical current, proportional to the amount of transmitted light, that causes a needle to move on a meter (called a galvanometer).

The meter scale actually shows both the percent transmittance of light (%T) through the solution and the proportional absorbance of light (A) by the solution. **Since the concentration of a solution is directly proportional to the absorbance, it is the scale that is usually read rather than the percent transmittance**. This makes determining the concentration of a solution much easier than it would be using an inverse log calculation.

If the absorbance of light by a solution of known concentration is measured, then this relationship can be used to convert the light absorbance of a test solution into its proportional concentration. The general formula that describes this relationship is:

$$\frac{\text{Absorbance}_{(\text{known})}}{\text{Concentration}_{(\text{known})}} = \frac{\text{Absorbance}_{(\text{unknown})}}{\text{Concentration}_{(\text{unknown})}}$$

Therefore we obtain the Beer's Law Equation:

$$\text{Concentration}_{(\text{unknown})} = \frac{\text{Concentration}_{(\text{known})} \times \text{Absorbance}_{(\text{unknown})}}{\text{Absorbance}_{(\text{known})}}$$